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Virginia Opossum (*Didelphis virginiana*)

Description

The Virginia opossum, or 'possum for short, is North America's only marsupial. This interesting group of mammals (Order Marsupialia) was named for its mode of reproduction. The female carries, protects, and nurses her young in her marsupium, an external abdominal pouch. The opossum is "related" to kangaroos, wallabies, koalas, and bandicoots since all exhibit this type of reproduction. The Virginia opossum is a member of the Family Didelphidae, a group of New World (North and South American) opossums.

Captain John Smith, the English colonist saved by the Indian maiden Pocahontas, gave the opossum its common name. As the story goes, he asked an Algonquin Indian, a native of the area which is now Virginia, what to call this unique animal. The Indian grunted, then replied "pasum" or "possum". Captain Smith interpreted the grunt as part of the animal's name, and dubbed it the "Opassom". In 1608, he described the animal in his book True Relation:

"An Opassom hath an head like a Swine, and a taile like a Rat, and is of the bignes of a Cat. Under her belly she hath a bagge, wherein shee lodgeth, carrieth, and sucketh her young."¹

¹See Possums, by C.G. Hartman.



This description was fairly accurate. With its grizzled gray fur, cone-shaped head, pointed snout, small black shiny eyes, and long hairless tail, the opossum does resemble a rat. The opossum's dense underfur is white with black tips. Longer guard hairs are coarse, sparse, and pale or whitish. Overall, the opossum usually has a pale gray, grizzled appearance, although there may be great color variation between individuals within a given area. The coat may appear grayish, brownish, or almost black.

The opossum's belly is darker than the gray back. Its head is whitish, and there may be a short, narrow, vertical black streak at the center of the crown. The fairly large, upright ears of this animal are thin, hairless and black bordered with white. The white edges of the ears of opossums seen in New York may be damaged or missing due to frostbite. The feet and the relatively short legs are black. Each foot has five white toes. The hallux, or "big toe", of the hind foot is opposable; like our thumbs, it can be bent inward to touch the other digits (fingers or toes). The opossum uses each opposable hallux to grasp branches while climbing. Except for the hallux, all toes are equipped with claws. The long, tapering tail is prehensile (adapted to coil around branches as a support while climbing). Contrary to popular belief, opossums do not often hang from trees by their tails. An adult is too heavy to be supported by the tail alone, and a young opossum will not usually hang from a tree unless posed that way by a photographer.

The opossum's tail is black at its base, and a light flesh color for about two-thirds of its length at the tip.

Sex or age of opossums cannot be determined by color alone. A male's chest fur may have a yellowish stain from secretions of a gland located in the throat region. The function of this gland is unknown. Females possess a fur-lined abdominal pouch, but this is not obvious unless pouch young are clamboring about, or unless the animal is "in hand".

As Captain Smith observed, the adult opossum is about the size of a large house cat. Males tend to be slightly larger than females. The total length (including tail) of an adult opossum may be 610-825 mm (24-33 in). Males may be up to 930 mm (37.2 in) and females may reach 912 mm (36.4 in) in total length. Tail length ranges from 229-350 mm (9-14 in) and hind foot length may be 51-76 mm (2.04-3.04 in). Studies of New York State opossums found an average weight of 2789g (6.10 lbs) for adult males and 1886g (4.16 lbs) for adult females. Adult males may weigh up to 5037 g (11.10 lbs) and females may weigh up to 3228g (7.25 lbs). Weight varies between individuals and an individual's weight fluctuates greatly from season to season. Opossums are generally heaviest in the fall and early winter, then they lose weight throughout winter and early spring.

Distribution and Abundance

The range of the Virginia opossum extends from southeastern Canada, through the Eastern United States, west to Nebraska, Kansas, Oklahoma and Texas, and south to Central America. The opossum was introduced early this century in the Pacific Coast Region and is found now in a narrow range extending through western Oregon, Washington, and California.

This mammal is a relative newcomer to New York State. It was well-established on Long Island before 1880, but was not seen in upstate New York until the 1920's. The opossum is still extending its range northward throughout New England and into Canada. It can now be found in southern Ontario, throughout New York, Connecticut, Rhode Island, and Massachusetts, and in southern regions of Vermont, New Hampshire and Maine. At the same time, its range has been extending slowly westward. It is not known why this animal's range has expanded. Possibly milder winters during this century have provided a more hospitable environment for this animal in the north.

Another reason might be that land retired from farming and reverting to forestland during this century has provided more habitat in the north.

Opossum populations correspond to the severity (coldness) of winters in New York State. According to a New York State Department of Environmental Conservation telephone survey concerning furbearers trapped in central and western NY, 25% more opossums were taken during 1980-81 than during 1979-80. This increase is thought to reflect an increased population following fairly mild winters. The sensitivity of opossum populations to winter weather is also reflected by their pattern of annual population fluctuations; numbers tend to peak in the fall and decline during winter.

Although opossums inhabit nearly all of this state, their populations tend to be largest and better-established in southern parts of the state where this animal has been present the longest. If habitat is favorable, relatively large numbers of opossums are present. In New York State, opossum population numbers vary with latitude, elevation, and habitat. Populations decrease as elevation increases, probably due to severity of weather. For example, the opossum is relatively uncommon in the Catskill and Adirondack regions, and is virtually absent in the Adirondack High Peaks.

W.J. Hamilton, Jr., in a study at Montezuma National Wildlife Refuge in 1948, estimated the population density there at 20 or more opossums per 2.6 km² (1 mi²). He judged that this or greater densities can be reached in favorable habitats, and estimated the total New York State population between 250,000 and 300,000 individuals. He also predicted that the opossum population in this state might even reach 1 million. Another study of the same area in 1971 showed a population density of 37 adult opossums per 2.6 km² (1 mi²). It was estimated that fall populations there may reach 250-300 individuals per 2.6 km².

Life History

The reproductive biology of the opossum is unlike that of any other native New York State mammal. This animal's scientific name, *Didelphis*, means "double womb". This refers to the female's two separate uteri. This term might also refer to the female's "internal womb", the uterus, and her "external womb", the pouch in which the young spend many weeks completing their development. The male opossum is unique as well; naturalists long ago

noted its forked penis and were confused about breeding in opossums. Old myths stated that these animals breed through the female's nose (the only double entrance they thought could accomodate a forked penis), then the young are later sneezed into the pouch where they continue development! Of course this is untrue; breeding in opossums is similar to that in other animals.

In New York State, some adult female opossums (about 50%) may have two litters per year. Mating activity peaks from late January to late March and again from mid-May to early July. This coincides with the female's estrous cycle which averages 29.5 days duration. A female opossum in heat is receptive to the male for a period of only 36 hours. After breeding, the female resumes her aggressiveness and the two animals part ways. Opossums are polygamous; a male may mate with more than one female, and will usually try to mate with any female encountered. The male does not establish a territory and plays no part in raising the young.

In just 13 days, the young are born. Before the birth begins, the female sits with the opening of the birth canal forward and her legs extended. She licks clean her pouch and licks down the hair between the birth canal opening and the pouch opening. The only "assistance" the female gives her newborn is to lick them free of the amniotic fluid which surrounds them at birth. Under their own power, the newborn opossums crawl the 5-7.5 cm (2-3 in.) up the female's belly to the pouch opening. During their trip, some of the young may fall out of the females fur or off her belly and eventually die.

The young are amazingly well-adapted for this journey. They use their muscular forelimbs and clawed forefeet in an arm-over-arm "swimming" motion. These claws fall off and are eventually replaced by "real" claws which develop later. The olfactory (smelling) parts of the young opossum's brain and its nose are well developed at birth. The young locate the pouch entrance by odor. They cannot use vision, since their eyes are not open at birth. Nor can they use gravity to orient themselves, because their inner ears (the structures by which gravity is "sensed") are undeveloped. Most of the newborn's structures are almost embryo-like in development. Hindlimbs are mere "buds" at birth. The young opossum is pink, hairless, nearly transparent and only about the size of a honeybee. It weighs 0.13-0.16 g (0.0046-0.0056 oz.); it takes about 23 newborn opossums to equal the weight

of a penny. The newborn are usually 13-14 mm (about 0.5 in) long. W.J. Hamilton, Jr. reports that 24 young will fit into a teaspoon!

Protected inside the female's pouch, the small opossums nurse and continue to develop. Once a young opossum is attached to a teat, the nipple lengthens and acquires a bulbous end. From then on, it is very difficult to detach a young opossum from the nipple. For a long time it was thought that the female "pumped" milk into her young, or that the young opossum's tongue became intimately connected with the teat. Now it is known that the marsupial young suckles in much the same way other mammals do. Young in the pouch remain attached to the

nipples for 50-70 days. After this, they may leave the pouch for short jaunts onto the female's back. They begin to eat solid food, but return to the pouch for milk, warmth and protection until they are 2.5 to 3 months old when they are fully weaned. At this time they remain outside the pouch for longer periods of time. They "ride" on the female's back by grasping her fur with their feet and tails. An old myth contends that the young opossums hang by their tails in a row from the female's tail held over her back. This is impossible, since the adult opossum cannot bend its tail over its body, and its tail cannot support the weight of 8-9 young!

As the young continue to grow, the female demonstrates very little "maternal" behavior. She does not defend the young and does not "round them up" should they stray too far. When only 3 months old, the young become independent, and the female is ready to breed again. The young opossums become sexually mature and breed when one year old. During September to



October, the young may disperse over as much as 40-120 hectares (100-300 A) from their birthplace. Males tend to disperse farther than do females.

Except during the short period when the young are associated with their mother, opossums are not sociable. Each opossum lives a solitary life, and when it encounters another individual the two are usually aggressive toward each other (except for the mating encounter). During the day, and during extremely cold winter nights, an opossum is alone within its den in an abandoned woodchuck burrow, in a hollow tree, or under brush or rocks.

Opossums are most active from about 11 p.m. to 2 a.m. each night, although they may begin to forage for food after sunset. An opossum will search for food while walking slowly with its head lowered. Using its dexterous hands and muscular, prehensile tail, it will sometimes climb a tree in search of food, but it usually stays on the ground. Although its night vision is somewhat better than its daytime vision, the opossum relies mostly on its olfactory (smelling) sense to locate food. It usually forages near water. Its nightly range depends upon that individual's food requirements and "disposition" toward activity. Determination of home range size is difficult because these animals are transient, but estimates range between 4-20 hectares (10-50 A), with movement greatest in cultivated areas. An opossum usually moves within an oval-shaped range or along roads, ditches, habitat "edges", or water courses, travelling up to 3.2 km (2 mi) in one night if food is scarce.

The opossum is an opportunistic feeder, eating whatever food is available at a particular time and place. Sometimes this animal is described as a scavenger, due to its habit of feeding on carrion (dead flesh). In New York State the opossum might better be classified as a "predator". With its complement of 50 teeth (more than any other mammal in this state), the opossum preys on small mammals, birds, insects, and even amphibians and reptiles. W.J. Hamilton, Jr. studied the diets of 461 opossums from New York State at all times of the year. He found that their diets consisted (by volume) of: 7.9% insects (grasshoppers, crickets, beetles, caterpillars, and insect larvae), 22.6% mammals (mice, shrews, young rabbits, chipmunks), 8.1% vegetation (grass, clover and other plants), 14.1% fruits (grapes, blackberries, raspberries, apples, wild cherries), 10.3% worms, 9.3% amphibians (toads, frogs, salamanders), 7.2% birds (domestic fowl, ducks,

pheasants, songbirds), 3% snails and slugs, 5.6% reptiles (snakes and newly hatched turtles), 6% carrion, 1.9% grain, and nuts. Over 50% of animals collected during May-October had eaten some insects. The recent success of the opossum in the Northeast may be due to its highly generalized diet.

During the day and especially during cold weather, the opossum will take shelter in some sort of den. This often is an abandoned woodchuck burrow, or a natural cavity in a hollow tree, fallen log, or rock or brush pile. This animal may also seek cover in a vacant squirrel nest, in a drain pipe, or under a building. Only in severe weather will an opossum occupy the same den on consecutive days.

Sometimes a 'possum constructs a nest of dry leaves and grass within the den. The opossum collects leaves in its mouth, passes them under its body with its forefeet, then grasps them with its tail. In this manner, it carries nesting material to the den. The 'possum may remain in its den for several days during very cold weather, but eventually it must venture out to feed. Opossums do not store food for the winter and do not hibernate. Instead, they accumulate a layer of fat in the fall and continue to feed throughout the winter. Some opossums have been observed foraging even when temperatures dip to -18°C (0°F) or below. However, many opossums do not survive the winter. They face the possibility of starvation when food is difficult to find.

These animals are also highly susceptible to frostbite and death due to exposure to cold. Their fur is too thin for good insulation and unfurred areas such as the tips of their tails and ears are often damaged or missing (sometimes the animal will chew off frostbitten tissue). Due to heavy winter losses and other mortality factors, most opossums do not reach 2 years of age. One study in Ohio reported that typically 75% of an opossum population is young of the year, evidence that population turnover is rapid.

Automobiles contribute significantly to yearly mortality of opossums. These animals are susceptible to being hit due to their nocturnal habit of foraging for carrion along roadsides. Some people attribute automobile-caused opossum mortality to the animal's slowness and "nearsightedness".

Predators have only a minor influence on opossum populations. These animals are not susceptible to nest predation since the young travel with their mothers. Birds of prey, especially the great horned owl, occasionally

take newly independent young. Dogs, foxes, bobcats and coyotes sometimes prey on opossums. In New York State, a few opossums are taken in traps usually set for other species.

Although most of the time an opossum will merely run to brushy cover to escape a predator, it is noted for its defensive technique of "playing possum". Sometimes when the animal is threatened it will "pretend" to be dead by becoming limp, motionless, and partially curled. While in this state of "shock", the animal's mouth is open exposing its many teeth. It may drool, and its respiration is shallow. This state may last only a minute or it may continue for hours. It was thought that the animal voluntarily "pretends" to be dead. Now, it is known that "playing 'possum" is an involuntary physiological reaction to danger. This animal usually walks slowly at about 1.10 km/hr (0.7 mph) but it may reach a speed of 7 km/hr (4 mph) when running. Sometimes a threatened opossum will climb a tree to escape predators. It usually climbs no more than 4-5 m (15-20 ft). A cornered opossum may take a defensive posture, baring its teeth and possibly hissing or growling. If grasped, it may defecate, pass gas, or exude a secretion from glands near its anus.

Opossums have fewer external parasites than other animals of comparable size (such as the woodchuck). Ticks and fleas are fairly uncommon on them. Internal parasites, such as nematodes and trematodes are common. In one study, roundworms were found in every individual examined. Opossums occasionally contract tularemia or leptospira.

The opossum's tracks, like its appearance and its life style, are fairly distinctive. The handlike front feet make a star-shaped impression in mud or snow. This front footprint is about 5 cm (2 in) wide. The hind track is either beside or just behind the front foot's imprint. The hind foot print is distinctive in that the "big toe" is pointed inward at a 90° angle, or is pointed slightly backward. On each footprint, prints from the 5 toes are usually visible. The 3 middle toes of the hindfoot are usually grouped together. Distance between steps ranges from 13.8-27.5 cm (5.5-11 in). These animals make no distinctive "runways" or paths. Scats are grayish, irregularly shaped, and about 6.3 cm (2.5 in) long and 1.3-1.9 cm (0.5-0.8 in) in diameter. These are deposited anywhere and are of various forms due to the animal's varied diet.

The opossum makes no characteristic noises; it is one of our quietest mammals. It may hiss, growl or screech when provoked or when aggressive toward another opossum.

Habitat

The opossum frequents a wide variety of habitats. This animal, however, seems to prefer lowland areas with swamps or wet woodlands, or areas near wooded streams or lakes. The opossum also travels along dense, brushy hedgerows or woodland edges, or through orchards and cropland in its nightly searches for food. Sometimes, this opportunistic feeder will venture into towns or urban areas in search of food.

Ecological Role

The opossum's very generalized, omnivorous diet plays an important ecological role in two ways. First, because it eats many different things, the opossum does not directly compete with any other animals. This allows the opossum to occupy its own "niche" within the environment. Only the raccoon and the rat have somewhat similar diets. Second, since the opossum operates at several different trophic (feeding) levels (i.e., herbivore, carnivore, carrion feeder), it adds complexity to the food web. By interacting with many other species, the opossum plays a central role in maintaining the stability of the community.

The opossum is also important ecologically because it is so unique. It is the only mammal in North America with a prehensile (grasping) tail, and the only one (except humans) with an opposable "thumb". It is the only marsupial inhabiting North America.

Economic and Social Values

The opossum, because it is both common and unique, has been featured in human folklore, art and poetry for centuries. This animal represented the god of fertility in the Mayan culture (the Indians of Central America). In fact, it is the first marsupial with which "Western Civilization" came into contact. In 1500, the Spanish explorer Vicente Yáñez Pinzón was the first to note this unique mammal. (For more interesting opossum folklore see C.G. Hartman's book Possums.)

Today the opossum can be seen most easily while driving along rural roads at night. Motorists often see this mammal crossing the road or foraging along the roadside. Often, these animals fall victim to the passing automobiles.

In the Southern U.S. the opossum is considered a game animal where it is often hunted with dogs at night. In New York State the opossum is a regulated furbearer. Few are hunted or trapped for their meat. Most are caught unintentionally in traps intended for other more valuable furbearers such as fox, raccoon and mink.

There are those who view the opossum as a troublesome pest which raids poultry houses and preys on ground nesting game birds. This reputation is largely undeserved; with the poultry management systems used today only rarely does an opossum prey on poultry. Stomach analyses show opossums will eat game birds, but many of these 'possums may actually have fed on carrion. Where birds are concentrated in small areas, such as waterfowl refuges, opossums may become a pest by feeding heavily on nestlings. In general, though, the opossum differs from other predators in that it feeds regularly on small food items such as insects or small mammals. In fact, in some areas it may remove insects and small mammals harmful to agriculture. Most researchers and wildlife managers conclude that the opossum is of little economic significance to humans.

Some people have dubbed the opossum "primitive" and "dull-witted" or "stupid". Although the opossum does possess some such ancestral characteristics, it is well-enough adapted to be increasing its numbers and expanding its range in the Northeast. It is useless, in the animal world, to call an animal "stupid". Even though the brain size of the opossum is only about one-fifth that of the raccoon, it is not necessarily "stupid". The opossum just does things differently; it has its own set of unique adaptations.

Control Methods

An opossum may become a nuisance by killing poultry, by digging up lawns (while looking for grubs), or by preying on nestling waterfowl. These troublesome individuals can be removed by trapping. The opossum is now considered a game animal in New York State. This means it is "protected"; it

may be taken (trapped or hunted) only during certain seasons, and in the number and by the methods specified by the NYS Department of Environmental Conservation. For more information about regulations concerning opossums contact your local conservation officer. A 23x23x81 cm (9x9x32 in) live trap may be set at the damage site or on a regularly travelled route. A No. 2 steel trap may be used where nontarget animals (such as pets) will not be caught. Because of its varied diet and keen sense of smell, the opossum will be attracted by many baits. Fish, canned cat food, or dog food suffice as bait. Livetrapped animals should be released far from the damage site. Burrows or holes used by the opossum should be closed off, and attractions such as food or garbage should be removed. This will prevent further problems caused by the same or other opossums.

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